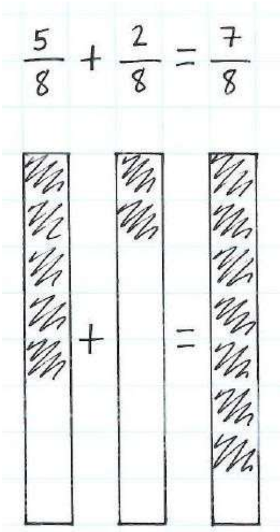
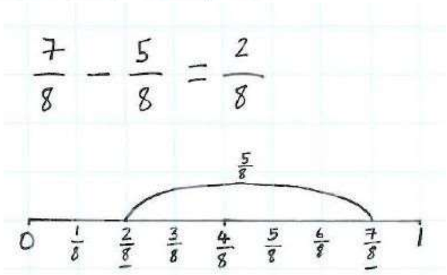
Fractions

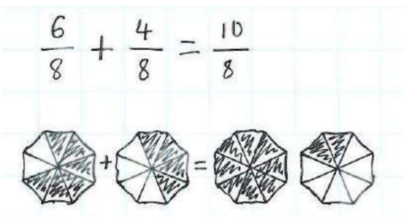
1. Add and subtract fractions with the same denominator within one whole





This method should be practised with multiple representations before completing the abstract calculation. There is no requirement to go beyond a whole.

2. Add and subtract fractions where the answer may be an improper fraction



This method also demonstrated how to calculate an answer that may be an improper fraction.

3. Add and subtract fractions where one denominator is a multiple of the other

$$\frac{2}{6} + \frac{1}{3} = \frac{4}{6}$$

$$\downarrow{\times 1} \qquad \downarrow{\times 2}$$

$$\frac{2}{6} + \frac{2}{6} = \frac{4}{6}$$

$$\frac{3}{4} + \frac{4}{8} = \frac{10}{8}$$

$$\downarrow{\times 2} \qquad \downarrow{\times 1}$$

$$\frac{6}{8} + \frac{4}{8} = \frac{10}{8} = 1\frac{2}{8}$$

The fractions are converted to find the lowest common multiple for the first time. Knowledge of multiples is used to find the lowest common multiple rather than multiplying the two denominators.

4. Add and subtract fractions with different denominators

$$\frac{1}{3} + \frac{2}{5} =$$

$$\downarrow{\times 5} \qquad \downarrow{\times 3}$$

$$\frac{5}{15} + \frac{6}{15} = \frac{11}{15}$$

$$\frac{6}{8} - \frac{1}{6}$$

$$\downarrow{\times 3} \qquad \downarrow{\times 4}$$

$$\frac{18}{24} - \frac{4}{24} = \frac{14}{24}$$

Both common denominators are converted to the lowest common multiple. The arrows indicate what the numerator and denominator are being multiplied by when finding the equivalent fraction.

5. Add and subtract a mixed number to a fraction where there are different denominators

$$\frac{5}{15} + 1\frac{1}{3} =$$

x1 x3

$$\frac{5}{15} + 1\frac{5}{15} = 1\frac{10}{15} = 1\frac{2}{3}$$

This method requires identifying the lowest common multiple. A possible misconception here is that childrenmay, in finding the equivalent fraction, multiply the whole number.

$$1\frac{2}{5} - \frac{3}{10} =$$

x2 x1

$$1\frac{4}{10} - \frac{3}{10} = 1\frac{1}{10}$$

6. Multiply proper fractions and mixed numbers by whole numbers

$$\frac{2}{3} \times 4 = \frac{2}{3} \times \frac{4}{1} = \frac{8}{3} = 2\frac{2}{3}$$

For proper fractions, this method should be used through repeated addition alongside a representation.

$$2\frac{3}{4} \times 3 = 6\frac{9}{4} = 8\frac{1}{4}$$

$$2 \times 3 = 6$$

$$\frac{3}{4} \times 3 = \frac{9}{4}$$

For mixed numbers, whole numbers should be multiplied first before multiplying the proper fraction through repeated addition.

7. Multiply simple pairs of proper fractions writing the answer in its simplest form

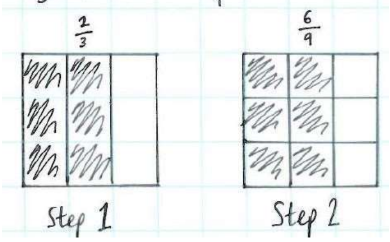
$$\frac{5}{8} \times \frac{6}{7} = \frac{30}{56} = \frac{15}{23}$$

$$\frac{4}{12} \times \frac{3}{4} = \frac{12}{48} = \frac{1}{4}$$

The numerators of both fractions are multiplied together as are the denominators.

8. Divide proper fractions by whole numbers (for when the numerator is and is not a multiple of the whole number).

$$\frac{2}{3} \div 3 = \frac{2}{9}$$



$$\frac{2}{3} \div 3 = \frac{2}{3} \div \frac{3}{1} = \frac{2}{9}$$

$$\frac{2}{3} \times \frac{1}{3} = \frac{2}{9}$$

The first method shows the pictorial representation of dividing a fraction. For example, $\frac{1}{2} \div 2$ means splitting one half into two equal parts. In the first example, two thirds is divided into three equal parts giving $\frac{6}{9}$. Then, $\frac{6}{9}$ is then divided by 3 to give an answer of $\frac{2}{9}$.

In the second method, the whole number is converted into an improper fraction before it is changed to a reciprocal of the divisor. The final step is multiplying as explained previously.